

This is a matter of great practical importance, since the Maltese themselves refuse to believe that Malta fever is milk-borne, although the Commission sent out in 1904-5-6 to investigate the disease proved this up to the hilt. Since then the Maltese have been exporting their Malta-fever-carrier goats, and spreading this serious human disease far and near. That this should be permitted would seem to be beyond belief, but, looking nearer home, we must remember that our own milk supply is not quite free from the tubercle bacillus.

The American Government attempted to import Maltese goats in 1906. The drinking of the milk of these gave rise to an epidemic of Malta fever on board the vessel which conveyed them from Malta, and a woman in the quarantine station in America became infected. The sequel to this story is told in a recent report of the Board of Agriculture of America. The goats remained under strict quarantine and inspection for some two years, those showing marked infection with Malta fever being slaughtered from time to time. The result is that all the animals imported have been slaughtered—even the kids born in America—not a single animal could be saved, on account of Malta-fever infection.

This disease is becoming more widespread every year. Last year the Sleeping Sickness Commission of the Royal Society discovered an epidemic of it affecting a large part of the native population round the shores of Lake Albert Edward, in the south-west corner of Uganda, and the native goats in that out-of-the-way place were found to be the carriers, just as in Malta.

In regard to the result of forbidding the use of goats' milk to the sailors and soldiers in Malta, it cannot be too often repeated that this simple order at once led to the extinction of the fever in the garrison. This does not, of course, refer to the native population, among whom the incidence of the disease is as great as ever. In 1905, before the preventive measures came into operation, there were 643 cases in the Army alone; in 1906, 147; in 1907, 11; in 1908, 5; in 1909, 1; in 1910, 0.

#### THE KING AND THE ROYAL SOCIETY.

AMONG the addresses received by the King at St. James's Palace on June 9 was one from the Royal Society, which was presented by a deputation consisting of Sir Archibald Geikie (president), Sir Andrew Noble (vice-president), Mr. A. B. Kempe (treasurer and vice-president), Sir Joseph Larmor and Prof. J. R. Bradford (secretaries), and Sir William Crookes (foreign secretary), with Mr. R. Harrison (assistant secretary) bearing the mace.

In the course of the address it was stated:—

We are proud to remember that no less than forty-seven years ago King Edward was graciously pleased to enter the Fellowship of the Royal Society, and later, on his accession to the Throne, to become our Patron.

Your Majesty enters upon the duties of your high station with a wider personal knowledge of the Empire and its various peoples than was ever possessed by any previous Sovereign of this country. Your subjects have had many proofs that this extended knowledge has been accompanied by an active sympathy with every cause and movement that will promote their welfare and happiness. The interest which your Majesty has shown in the progress of discovery and invention assures us that these elements of national greatness will continue to receive your favour and protection.

His Majesty replied as follows:—

I thank you for the loyal address of condolence from the president, council, and Fellows of the Royal Society on the death of my beloved father. It is a consolation to

feel that your society, numbering amongst its fellows the most distinguished men of science of this country, sympathises with me in my terrible bereavement.

Your words of appreciation of the character of the late King are very welcome to me. He always regarded with the deepest interest those scientific discoveries, and those applications of discoveries already made, which have been of such supreme importance in the advancement of civilisation. I also have watched with close attention the work of your society, and it is my sincere hope that its prosperity will continue, and that a Fellowship of the Royal Society will always be esteemed one of the highest honours which can be earned by devotion to the cause of science.

I desire to thank you most cordially for your congratulations on my accession to the Throne, and to assure you of my sympathy and support in your beneficent efforts for the promotion of natural knowledge. I gladly accede to your request that I should inscribe my name as Patron in your charter book.

#### PROF. GEORGE F. BARKER.

PROF. BARKER, whose death was announced last week, was one of the most genial men of science on the other side of the Atlantic. He was a frequent visitor in London, and invariably of recent years, during the period of his stay, he was made an honorary member of the Athenæum. He was born in Charlestown, Mass., in 1835, and died on May 25 last. He was educated in the Boston public schools, finishing at Yale, where he graduated in 1858.

The American system of education is continuous and methodical, and whatever line of pursuit an American boy is prepared for, he is ultimately turned out well drilled for his future career. Barker commenced in the Albany Medical College, where he received the degree of Doctor of Medicine in 1863, and was appointed professor of chemistry at Wheaton College, Illinois. Thence he proceeded to the Western University of Pennsylvania in the same capacity, but later he became professor of physiological chemistry and toxicology. In 1872 he was appointed professor of physics at the University of Pennsylvania, in Philadelphia, and there he taught until 1900, when he retired on account of ill-health.

Prof. Barker was an admirable teacher and expounder, but he did not undertake much research, and therefore his name is not so well known in the scientific world as that of many of his countrymen. He was much engaged as an expert witness, especially in patent cases. He acted as United States Commissioner to the Paris Electrical Exhibition of 1881, to the Electrical Exhibition held in Philadelphia in 1884, and he took a very prominent part on the jury of the electrical department of the great exhibition in Chicago in 1893. He was a past president of the American Chemical Society and of the American Association for the Advancement of Science. He had served as vice-president of the American Philosophical Society, the headquarters of which are in Philadelphia, since 1899. His English friends will miss him very much when they visit America.

#### NOTES.

SIR JOHN GAVEY, C.B., will deliver the James Forrest lecture at the Institution of Civil Engineers on June 22. The subject will be "Recent Developments of Telegraphy and Telephony."

A CONVERSAZIONE of the Institution of Electrical Engineers will be held at the Natural History Museum, South Kensington, on Tuesday, June 28.

PROF. T. W. RICHARDS has accepted the invitation of the council of the Chemical Society to deliver the Faraday lecture of the society next session.

THE death is announced, at the age of eighty-four years, of Prof. W. P. Blake, emeritus professor of metallurgy, geology, and mining, and director of the School of Mines of the University of Arizona.

A CORRESPONDENT says he "would like to ask Messrs. Cowell and Crommelin whether it is not highly probable that the Star of Bethlehem was, after all, nothing else than Halley's comet"? We submitted the inquiry to Dr. Cowell, who has been good enough to reply that he does not consider it "highly probable" that the two objects are identical.

It is proposed to establish, under the title of the India Society, an association to promote the study and appreciation of Indian culture in its æsthetic aspects. The new society will publish, for distribution to its members, works showing the best examples of Indian architecture, sculpture, and painting, and will assist in the preservation of the traditional arts and handicrafts of the Empire. The honorary secretary is Mr. T. W. Rolleston, Ardeevin, Christ Church Road, Hampstead, N.W.

THE National Association for the Prevention of Consumption is inaugurating an educational campaign against tuberculosis. So great has been the success of the Travelling Tuberculosis Exhibition that the council is convinced that the time has come for a vigorous and widespread effort. A special appeal committee has been appointed, over which the Earl of Derby will preside, to raise funds. Its object is to raise an annual income of 5000*l.* for the purpose of spreading information on the question of the cure and prevention of consumption. This campaign is to be carried out by means of travelling tuberculosis exhibitions; caravans, with lantern-slides, for small towns and villages; popular lectures; an information bureau; and the distribution of literature. The cooperation of all persons is solicited to aid in raising the fund, which will be applied entirely to educational purposes, as the committee feels that if the country can be aroused to a comprehension of the loss in life and money occasioned by tuberculosis, and the methods by which the disease can be controlled, ultimate conquest is assured.

THE Italian earthquake of June 7, referred to last week, occurred in a district which is frequently disturbed by shocks from more or less distant centres, but in which they rarely originate. Avellino, where the recent shock was strongly felt, is thirty miles east of Naples. The epicentre of the earthquake was, however, about thirty miles still farther to the east, including the villages of Calitri and San Fele, at both of which there was much damage to property and some loss of life. The only important earthquake which is known to have occurred in the same centre is that of September 8, 1694, when more than four thousand lives were lost. Calitri was then entirely destroyed, and at least 700 persons were killed. The epicentre of both earthquakes lies only a few miles to the north-west of that of the great Neapolitan earthquake of 1857, and not far from the continuation of the isoseismal lines drawn by Mallet in his well-known report.

PROF. RONALD ROSS, in an address to representatives of the missionary societies of the world meeting at Livingstone College on Commemoration Day, June 11, urged that missionaries, like the priests of old, should be healers both of the mind and of the body. He suggested that missionaries might ascertain, by the examination of the spleen, whether children in the tropics were affected by malaria, and that this would give a rough indication of the amount of malaria in the district. He suggested that

quinine might then be administered to the children in the district, and that this would tend to check the spread of the disease. He also hoped that they would be able to assist in drainage schemes, so that the breeding places of mosquitoes might be eradicated. He thought all missionaries should have such training as that given at Livingstone College, in order to be enabled to share in these sanitary precautions.

MANY meteorologists will be glad to learn that the activity of the British Rainfall Organisation, founded some fifty years ago by the late Mr. G. J. Symons, has been placed upon a permanent footing by the transfer of the management by the director, Dr. H. R. Mill, to a strong representative board of trustees interested in rainfall work. The board will consist of Dr. Mill (as chairman), Mr. F. Druce (treasurer), Mr. R. M. Barrington, Sir Alexander Binnie, Mr. C. L. Brook, Mr. C. J. P. Cave, Mr. D. W. Freshfield, Dr. H. Mellish, Sir John Murray, and Mr. J. G. Wood. The board, with the aid of other observers, will form an endowment fund for the continuance of the work, which hitherto has been dependent on the efforts of its promoters and voluntary contributions. The observers now number nearly 5000, and the accumulated records are quite unique. Dr. Mill now makes over the whole of the documents and the lease of the headquarters in Camden Square to the board of trustees as a free gift for the benefit of meteorological science.

THE fifteenth annual congress of the South-eastern Union of Scientific Societies was held at Guildford from June 8 to 11. Dr. D. H. Scott, F.R.S., was succeeded as president by Prof. Ernest Gardner, who delivered a discourse on the evolution of classical art. Some of the papers read were of much local interest, notably one by Mr. H. Bury on the relation of the River Wey to the Blackwater and the Arun—a study of river-development on the lines laid down by Prof. W. M. Davis. Another local paper dealt with the Pilgrims' Way between Farnham and Albury, in which Mr. J. G. N. Clift discussed the question whether the route was along the higher or the lower road. Mr. E. A. Martin explained his experiments on dew-ponds, made with the view of determining the way in which the supply of water was maintained. Dr. W. Martin showed in a learned paper how the bird's-eye views and maps of the sixteenth and seventeenth centuries should be interpreted. A lecture on colour in insects was given by Mr. J. W. Tutt, in which he pointed out the need of obtaining definite information respecting the changes which bring about differences of coloration. Dr. Vaughan Cornish lectured on waves in sand and snow, and Mr. A. R. Horwood, of Leicester, referred to the extinction of cryptogams. The Rev. R. Ashington Bullen is succeeded as honorary secretary of the union by Dr. William Martin, who will be assisted by Mr. Norman Gray. Next year's congress will be held at St. Albans, under Sir David Gill, K.C.B.

THE University of California, continuing the investigation of the numerous shell-mounds on the shores of San Francisco Bay, publishes in the fifth part of vol. vii. of its Proceedings a report on that at Ellis Landing, by Mr. N. C. Nelson. This is one of the largest of the series, and the period required for its accumulation is estimated at more than three thousand years. From the very beginning it was used both as a dwelling site and place of burial, and it was occupied by the Californian aborigines up to a time not long antecedent to the European discovery and occupation of the country. The earliest occupants were not savages of the lowest grade, and there is throughout the strata distinct evidence of the evolu-

tion of culture. The later inhabitants were skilled in various industries, and made journeys to, or had trade relations with, distant tribes. Even if it was from time to time occupied by migrants or enemies, these people were all essentially of the same type, and the last were Indians similar to the inhabitants of Middle California within historic times.

MESSRS. DULAU AND Co. have published part iv. of the "Treasury of Human Inheritance," the publication containing pedigrees, illustrative of the inheritance of various defects or other characters, issued by the Galton Laboratory for National Eugenics. The present part contains pedigrees of a large number of cases of hare-lip and cleft palate, with introductory explanation and bibliography by Dr. H. Rischbieth; pedigrees of hereditary deaf-mutism collected by the Eugenics Laboratory; and pedigrees of congenital cataract, collected and annotated by Mr. N. Bishop Harman. The pedigrees are given in the same general style as in previous parts, and the first and third articles are illustrated by a number of plates, which are exceedingly well reproduced.

MR. M. OSHIMA, of the Bureau of Scientific Researches at Taihoku, has been enabled to add twelve species to the twenty-nine recorded in Stejneger's "Herpetology of Japan, &c.," as indigenous to Formosa. Of these twelve additions, four species and one subspecies are regarded as new to science. Mr. Oshima's paper appears in vol. vii., part iii., of *Annotationes Zoologicae Japonensis*, which also includes four articles on as many groups of Japanese invertebrates.

To the June issue of Witherby's *British Birds* Mr. H. Wormald contributes an exquisitely illustrated article on the attitudes assumed by the mallard and certain other drakes during the period of courtship. The performance generally commences by four or five mallards swimming round a duck with their necks drawn in, and then suddenly lowering their beaks, and at the same time raising themselves nearly upright in the water and drawing the beak up the breast. For the other actions we must refer the readers to the paper itself, as they are difficult to describe.

In their thirty-eighth report (1909-10) the directors of the Zoological Society of Philadelphia state that in December last a large number of animals collected by the Smithsonian Institution expedition to East Africa, under Mr. Roosevelt, were temporarily accommodated in the gardens previous to their transport to the National Zoological Park at Washington. Specimens of Thomson's gazelle, waterbuck, Coke's hartebeest, and wart-hog became, however, the property of the society. The last-named species, we regret to see, figures in the list as *Macrocephalus* in place of *Phacochoerus*. When a name fits an animal so admirably as the latter does the wart-hog, it ought in no circumstances to be changed.

WE have to acknowledge the receipt of the report of the director of the Zoological Gardens at Giza, near Cairo, for 1909, in which it is stated that the season under review was unusually favourable to the animals, although the number of visitors was 26,239 less than in the previous year. To the late and present Governors of Senar the gardens were indebted for a large and representative collection of animals from the Blue Nile, while a feature of the year was the large number of species which bred in the menagerie. Jungle-cats and foxes were responsible for the deaths of several animals, while to rats, owls, &c., may probably be attributed the disappearance of many others.

IN past years locusts have caused enormous losses in South Africa to the farmers, who have usually, on religious grounds, taken no steps to destroy them. Since agricultural departments have been formed, locust officers have been appointed whose duty it is to collect information about the swarms and the places where eggs are laid, and to take such destructive measures as may be necessary. The report of the chief officer for Cape Colony for the past season has recently been issued in the *Agricultural Journal of the Cape of Good Hope* (No. 2, 1910). The most successful method of destruction is to spray the veldt with a dilute solution of sodium arsenite and treacle, or, if the grass is too short, to scatter some finely chopped green vegetation, bran, or even "voetgangers" themselves, previously soaked in the solution. When the swarm comes along it is immediately attracted by the treacle, and eats with great voracity, so that the insects soon begin to sicken and die. It is even recorded that a second swarm has come up and devoured the first, two swarms thus perishing through one spraying. At an earlier stage the destruction is a simpler matter—the insects are sprayed immediately they hatch out. Wherever these methods are adopted damage from locusts becomes comparatively small, and as soon as the religious scruples of the farmers can be overcome and adequate help is rendered, the locust plague will cease to be formidable because it can be controlled.

MR. E. HERON-ALLEN, writing from Large Acres, Selsey, sends an account of the extraction of several colours by him from purple iris flowers. The petals of from twenty to thirty flowers of the deep purple iris, which were either quite withered (shrivelled, but still moist) or just beginning to wither, were put into a jar and just covered with alcohol. At the end of ten minutes, (1) a bright and typically iris reddish purple solution was produced; (2) these soaked (in alcohol) blossoms, squeezed fairly dry and steeped in plain cold water for ten minutes, gave a bright ultramarine-blue solution, with no trace of purple or red; (3) these alcohol-soaked blossoms, left in the water for an hour, gave a deep (almost indigo) blue solution, with no trace of purple or red. Another similar lot of blossoms, cut just above the seed pod, were steeped in enough alcohol to cover them, for three hours, and gave a rich crimson solution with no trace of blue or purple. Several other brilliant and distinctive colours were obtained by various treatments of blossoms and residues. Mr. Heron-Allen's interesting observations remind us that while we have in this country a wide range of blue and red, as well as of yellow flowers, there is not, with the exception of woad (*Isatis tinctoria*), a single indigenous blue, or even red, colouring matter which has ever been of any importance as a dye-stuff. Many years ago woad was used to some extent as a source of indigo, while weld (*Reseda luteola*), dyer's-broom (*Genista tinctoria*), and many other yellow dyes were also employed, but we were dependent upon foreign countries for our colouring matters even when natural dye-stuffs were used. The chemical constitution of the colouring matter of the purple iris does not appear to have been investigated, but the results obtained by Mr. Heron-Allen may probably be explained by the extraction of traces of acid and alkaline bodies by the solvents used.

MR. JOHS SCHMIDT, head of the recent Danish expedition in the *Thor* for the investigation of physical conditions in the Mediterranean, has sent us a reprint of a preliminary report on the work of the expedition, published in *La Géographie*. The *Thor* cruised in the Straits of Gibraltar and along the north coast of Africa to Sardinia, then



explored the western Italian coast, and made some observations further east in the southern Adriatic and off the coast of Greece. The results are of great value and interest. Special attention may perhaps be directed to the section of the region west of the Straits of Gibraltar made between February 20 and 28, 1909, which may be compared with a similar section based on Dr. Wolfenden's observations made in the *Silver Belle* in 1904.

IN the *Sitzungsberichte* of the Vienna Academy of Sciences of December 9, 1909, Prof. W. Trabert discusses the connection between the temperature conditions of the atmosphere and the pressure at the surface of the earth. The inquiry is based upon observations of the temperature of the upper air during 1903-8 made by the aeronautical observatory at Lindenberg, and on the simultaneous behaviour of the barometer at the ground level. For this purpose those days were selected on which the air-column over Lindenberg was colder than the previous and following days, and *vice versa*. The results show, *inter alia*, that the barometer rises during the existence of cold air-columns; the minimum of pressure occurs generally on the day before, and the maximum on the day following. With warm columns of air the reverse holds good. After an extreme of pressure a column of extreme temperature occurs as a rule on the first or second day afterwards, *viz.* a warm column follows a high pressure, and *vice versa*. There is, at all events, an intimate connection between temperature conditions in the free air and pressure at the ground level, from which fact the author agrees with the opinion generally obtaining at the present time, that "the hope of meteorology lies in the upper regions."

AN extended series of tidal observations on the Pacific coast was obtained by the Canadian Tidal Survey during the summer of 1909, under the supervision of Dr. W. Bell Dawson, the superintendent of the Survey. There were in all a series of twenty recording tide-gauges in simultaneous operation along the coast of British Columbia. One noteworthy result obtained is that the time of high and low water at the head of the long inlets on the coast is very little later than at the mouth. For instance, at the head of Bute inlet high water is only seven minutes later and low water fourteen minutes later than at Lund, sixty-six miles below. The range of the tide at the head of the other inlets is only from 2 to 12 per cent. greater than at their mouth. This rapid progress of the tidal undulation must be due to the great depth of such inlets. Where the depth is so great, the whole surface of the inlet rises and falls simultaneously, in correspondence with the impulse at its mouth given by the rise and fall of the tide in the open. It would also appear that there is little current except in the mouth of the inlet, where the pulsation takes place. The results obtained by Dr. Dawson provide valuable information upon the subject of the progress of the tide in ordinary shallow estuaries and in deep inlets. They are in no sense, therefore, of merely local interest or local application, but they illustrate the general question of the rate of progress of the tide relatively to the depth of the channel or inlet.

THE velocities of certain reactions between metals and the halogens in solution form the subject of a paper by Messrs. R. G. van Name and Graham Edgar in the current number of the *Zeitschrift für physikalische Chemie* (May 24). Solutions of iodine and bromine in potassium iodide and bromide solution respectively were allowed to react with mercury, cadmium, zinc, copper, and silver at 25° C. and 35° C., and the velocities of solution of the metal measured. With iodine the velocity of solution was

found to be practically independent of the nature of the metal. The temperature coefficient of the reaction was found to be unusually low, about 1.3 for 10° rise, instead of 2.0 generally found for reactions in homogeneous systems.

SPECIAL interest attaches to a paper by the late Dr. Ludwig Mond on "Some New Metallic Carbonyls," which appears (with an introduction by Dr. R. L. Mond) in the *Journal of the Chemical Society*. A description is given of the apparatus, by means of which the action of carbonic oxide on metals could be tested at temperatures up to 450°, and at pressures up to 500 atmospheres. An account is also given of a new black cobalt carbonyl,  $\text{Co}(\text{CO})_3$ , prepared by the decomposition of the red tetracarbonyl,  $\text{Co}(\text{CO})_4$ , recently described, of a ruthenium carbonyl, of which only a small quantity was obtained as an orange-yellow deposit, and of a molybdenum carbonyl,  $\text{Mo}(\text{CO})_6$ , forming highly refractive white crystals which sublime without melting in an atmosphere of hydrogen or carbon monoxide at 30° to 40°.

PROF. H. B. DIXON's presidential address to the Chemical Society, reproduced in the *Society's Journal*, deals with the "Union of Hydrogen and Oxygen in Flames." He considers that the explosion of the two gases is a direct action, (1) because well-dried mixtures of electrolytic gas always explode with a spark; (2) because the velocity of explosion in a well-dried mixture is greater than when steam is added; and (3) because the explosion-wave is propagated exactly in the same way as a pressure-wave in the gas. In the case of the combustion of the gases at moderate temperatures, he agrees with Dr. Baker that steam plays an important part in the interaction of the two gases, but suggests that if once a flame is started the presence of moisture is not necessary for its propagation. During the combustion small amounts of hydrogen peroxide are formed, which can be preserved by allowing the jet to impinge on ice or on solid carbon dioxide. It has been suggested that hydrogen peroxide is the first product of the interaction, and this view has been supported on various grounds, as, for instance, on the ground that the primary interaction in a gaseous mixture must be between two molecules only. For these views no sufficient support appears to be forthcoming, and many of the arguments used in its favour are shown to be fallacious.

THE idea first expressed by Lord Rayleigh, and afterwards by Prof. Liebenow, that the high electrical resistivity of alloys was due to thermo-electric forces set up at the points of contact of the constituents of the alloys, has been taken up by several physicists, but no attempts to establish its truth experimentally have succeeded. In the *Physikalische Zeitschrift* for May 15 there is a communication from Mr. K. P. Brooks which appears to prove definitely that the idea is untenable. Mr. Brooks has measured the resistivity at different temperatures of columns consisting of a large number of thin gold and silver discs, and of sticks of compressed gold and silver dust, and has found that their resistivity and their temperature coefficient of resistivity lie between those of their constituents, and vary with composition according to the ordinary law of mixtures. Alloys of the two have, on the contrary, higher resistivities and lower temperature coefficients than have their constituents.

IN the *Revue générale des Sciences* of April 30 Prof. E. Cohen, of the University of Utrecht, writes of what he terms the "infectious diseases of metals." Under this heading he describes systematic observations on the allo-

tropic transformation which metallic tin undergoes at moderately low temperatures. More interesting, because of far wider importance, however, are his observations and views on what he terms the "maladie d'érouissage"; this is, in reality, simply a process of spontaneous annealing or re-crystallisation which occurs in certain circumstances in metals which have been severely hardened by plastic strain. So long ago as 1900 Ewing and Rosenhain showed that when pure lead has been freshly crushed or rolled, the minute crystals commence to grow, even at the ordinary temperature, at a rate which produces visible changes in a few weeks. Prof. Cohen's observations show that processes of this kind are not confined to lead, but occur also in harder materials, especially in hard-drawn brass, thus accounting for the spontaneous cracking of cartridge-cases which occasionally occurs in practice after a lapse of several years from the date of manufacture, on the view that the re-crystallisation process is accompanied by a change in volume. The whole process is favoured by any rise of temperature, so that the phenomena are more readily observed in hot climates. Whether such action takes place at possibly a still slower rate in iron and steel is a problem still to be investigated. An important fact brought out by Prof. Cohen's experiments, however, is that the process of re-crystallisation is initiated and accelerated by intimate contact with a piece of the same metal in the stable or "annealed" condition; it is, indeed, this phenomenon which leads Prof. Cohen to describe the whole process as an "infectious disease" of metals.

THE *Engineer* for June 3 contains a description of the Drutt Halpin system of thermal storage recently installed at the King's Road works of the St. Pancras Borough Council Electricity and Public Lighting Department. Each of four water-tube boilers has been fitted with a storage vessel, and some figures regarding the performance of the plant are certified by Mr. Baynes, the borough electrical engineer. Each boiler, as originally installed, had a maximum normal evaporation of about 11,000 lb. per hour. One boiler fitted with a thermal storage drum was run for 2h. 51m., the storage drum being full at the start and empty at the finish. During this time the average evaporation per hour was found to be 17,542 lb., or an increase of 59.5 per cent. more than the normal. During this test the average working pressure was 185 lb. per square inch, the temperature in the drum 360° F., and the draught at the boiler exit 0.5 inch by water-gauge. With this system it is found that deposits from hard water are found in the storage drum rather than in the boiler, and are therefore not subjected to the heat of the furnace, which would bake them to a hard scale. Such deposits are very easily blown off from the storage drum in a soft powdery state.

MESSRS. LONGMANS, GREEN AND CO. have published a third edition of Dr. F. Mollwo Perkin's "Qualitative Chemical Analysis: Organic and Inorganic." The first edition of the work was reviewed in our issue of August 22, 1901 (vol. lxi., p. 397), and it is sufficient to point out that to the present issue has been added a short section dealing with some of the rarer elements and a new chapter on ethereal salts.

A THIRD edition of Mr. Walter B. Priest's "Scheme for the Promotion of Scientific Research" has been published by Messrs. Stevens and Sons, Ltd. We dealt with the second edition somewhat fully in our issue of January 21, 1909 (vol. lxxix., p. 345). In the present edition the administration of grants has been further explained, and the author of the book proposes terms of allocations of

grants in relation especially to electrical science. The author hopes that the advantages to be gained by legislating for the promotion of scientific research, where it affects purposes of general utility and advantage, will receive serious consideration.

### OUR ASTRONOMICAL COLUMN.

THE METEOR OF JUNE 1.—Further observations of the large meteor of June 1 9h. 40m. have been received by Mr. Denning from various parts, and they are in very fair agreement with each other and with the values given by him for the height, radiant, &c., in *NATURE* for June 9.

The meteor was seen from Clapham Common passing from a few degrees below the pointers in Ursa Major to a place just north of "The Twins." The trail was a reddish-yellow colour, while the nucleus was a brilliant electric-blue. At Loughton, Essex, the meteor was viewed during a portion of its flight over the western sky. The object appeared extraordinarily brilliant, with a blue head and red tail.

As an instance of the erroneous impressions of nearness occasioned by the startling lustre of fireballs of this kind, it may be mentioned that the observer at Loughton estimated it as seventy yards distant, and thought it must have fallen behind a house near him. Search was made for fragments, but without avail. As a matter of fact, the meteor was more than 100 miles distant. The shower of Scorpiids to which it owed its origin is singularly rich in fireballs in June, and they form probably the débris of some dissevered, periodic comet the materials of which are now distributed into a wide stream.

COMING TOTAL ECLIPSES OF THE SUN.—From Dr. Pio Emanuelli we have received an abstract from the *Rivista di Astronomia e Scienze affini* (April) in which he discusses in detail the conditions of the total solar eclipses of the sun on May 9, 1910, April 28-29, 1911, and April 17, 1912. The eclipse of 1911 will have a period of totality of nearly five minutes, and the line of totality will completely traverse the Pacific Ocean; commencing on the east coast of Australia, it will terminate at a short distance from the west coast of Central America. A small chart given by Dr. Emanuelli shows the path of the shadow touching the islands of Nassau, Samoa, and Tonga. Vavau Island will probably afford the best *locale* for observations, and at the port of Neiafu, on the south-west coast, totality will last for 3m. 36.8s. with the sun at an altitude of 43°. At Tau, in the Samoan archipelago, totality will endure for 2m. 13s., the altitude being 51°. The last island to be traversed by the shadow will be Nassau, which is practically an uninhabited desert 1280 metres long and 914 metres across; but here the duration of totality will be 4m. 10s., and the altitude of the sun 57°.

THE NEW CANALS ON MARS.—In No. 422 of the *Observatory* (p. 215) M. Jonckheere states that, from observations made at Hem, there can be no doubt as to the reality of the two new canals recently described by Prof. Lowell. Independent observations by M. Jarry Desloges and himself disclosed these features, which were carefully studied at the Hem Observatory.

THE OBJECTIVE-PRISM DETERMINATION OF STELLAR VELOCITIES.—In No. 4, vol. xxxi., of the *Astrophysical Journal* Prof. R. W. Wood reports further progress in the preparation of light-filters for use in the objective-prism, radial-velocity work recently described by Prof. E. C. Pickering. It will be remembered that by employing a neodymium-chloride filter, Prof. Pickering introduced a fine absorption line into the spectra to which the stellar lines could be referred for measurements of velocity in the line of sight. Prof. Wood now finds that the addition of erbium chloride introduces another good reference line at  $\lambda$  382, whilst, with isochromatic plates, the narrow interspace between two neodymium bands at  $\lambda$  520 might be employed. With vapours he believes better results could be obtained, and he is also experimenting on the manufacture of solid screens by using a solvent which would solidify, such as styrol. The success attained so far is very promising for the final application of this method.